Initial DEQ Comments on the Draft Baseline Human Health Risk Assessment for the Portland Harbor Site

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Main General Comments

In commenting on the HHRA portion of the Round 2 Report, EPA directed the LWG to limit uncertainty discussions to the Uncertainty Section, rather than include uncertainty statements (limited to potential overestimation of risks) throughout the report. In this draft HHRA, uncertainty statements are again included everywhere in the report. My main suggestion to resolve this issue is to make a clear distinction between current and potential future exposure scenarios. This could be discussed in the presentation of the conceptual site model (Section 3.2.2, page 34). In some cases I agree that exposure assumptions are on the high conservative end for current exposure, but the assumptions are appropriately conservative for potential future exposure.

In the presentation of uncertainty, the range of variation in hazard index values is greatly overstated. This is because each toxic endpoint in an exposure scenario is considered independently. Instead, each scenario should be evaluated based on the chemical(s)/endpoint combination resulting in the greatest hazard index. For example, in Table 5-186, the HI range for tribal fisher direct exposure to inwater sediment across all half-mile segments is listed as 0.00000008 to 1. This range is developed using the very lowest chemical/endpoint combination (naphthalene causing whole body effects) to the highest chemical/endpoint combination (arsenic causing skin effects). The lowest HI for a scenario is irrelevant for decision making; decisions are based on the highest calculated HI at each location. The correct range for tribal fisher sediment exposure should be developed using the highest chemical/endpoint combination at each location (Table 5-36). This range is 0.002 (arsenic, skin effects) to 1 (dioxin TEQ, reproductive effects). In this example, the HI range in Table 5-186 is overstated by a factor of 25,000. This overstatement of HI uncertainty is typical of many other scenarios. The correct evaluation will need to be performed before the agencies have an appropriate view of uncertainty associated with non-cancer risks.

In many tables, the phrase “95% UCL or maximum exposure” should be replaced by “maximum reasonable exposure” or “RME”.

Also, there are numerous statements in the report regarding the compounding of conservative risk assumptions, resulting in what they consider are unreasonable final risk characterization results. This is also the main point of their 8 October 2009 letter. The approach used in this HHRA follows standard EPA guidance on risk assessments and is similar to risk assessment approaches used on other Superfund sites. There is no reason that the risk assessment for Portland Harbor should be considered exceptional with regard to reasonable maximum exposure assumptions. Also, acceptable risk levels are associated with the levels of conservatism typically applied in a risk assessment following agency guidance.

Clearly one of areas of most concern to the LWG is the selection of fish ingestion rates. For example, on page 55 the three main rates are referred to as high (17.5 g/day), higher (73 g/day), and highest (142 g/day). The information to refute these designations is presented on pages 120 - 121. The EPA rate of 17.5 g/day (two 8-oz meals per month) is based on the 90th percentile of the general population, which includes non-consumers of fish. The 90th percentile

for fish consumers is much higher (200 g/day). EPA uses the 17.5 g/day rate to approximate a fish-consuming population that does not include tribal or subsistence fishers. It is not an unreasonable rate, and should not be referred to as “high”. The rate of 142 g/day used by EPA in developing Ambient Water Quality Criteria for subsistence consumers is a high rate. However, we should be clear that subsistence fishers are a population with a high ingestion rate. The ingestion rate used for this population, though, is a typical ingestion rate for consumers who regularly eat resident fish, not an unreasonably high consumption rate for this population.

The ingestion rate of 175 g/day for tribal consumption is a high end rate. Nevertheless, DEQ is proceeding to develop state water quality limits based on this ingestion rate. This fact should be discussed in the risk assessment as support for the selection of 175 g/day as an appropriate fish consumption rate for tribal populations who regularly consume fish.

Comments

Page xxviii. The definition of “risk” includes many terms that are not defined.

Page 4, last sentence. The upper percentiles are based on the entire population, which includes non-fish consumers, and are used to represent smaller populations with higher exposure. They may not be upper-bound levels for the various populations of fish consumers.

Page 6, first paragraph. Replace “lifetime of exposure” with “lifetime”. In most scenarios, the exposure duration is less than a lifetime.

Page 7, Figure E-2. The uncertainty range for HI values is greatly overstated. See general comment.

Page 9, end of first and third paragraphs. Regional risk levels should not be presented unless they are discussed relative to site risks. Regional background risks are repeatedly brought up as being above acceptable risk levels. Rather than just imply that regional background risks and site risks from eating fish are unacceptable, the report should acknowledge that, although regional background risks may be up to 100 times acceptable risk levels, potential site risks may be up to 60,000 times acceptable risk levels. There should also be a discussion regarding the collection of much larger fish upstream of the study area. This biases high the chemical concentrations in the upstream fish because larger (older) fish are expected to have higher concentrations than smaller (younger) fish.

Page 9, second paragraph. Uncertainty should not be used as a criterion for selecting COCs. It can be used later in the feasibility study process.

Page 11, third bullet. The consideration of uncertainty in the risk management process is appropriate in the feasibility study but is not a finding of the risk assessment, and should not be included in this section.

Page 11, fourth bullet. Regional risk levels should not be presented unless they are discussed relative to site risks. The fact that regional risk levels from PCBs in fish are up to 100 times acceptable levels should be not be presented without acknowledgment that site risk levels from PCBs in fish are up to 60,000 times acceptable levels.

Page 34, Section 3.2.2 and Figure 3-1, Conceptual Site Model. The breastfeeding pathway should not be limited to fishers. EPA agreed to not have the pathway included in the draft HHRA pending direction from EPA. When breastfeeding is included in the final risk assessment, it will apply to all exposure pathways for bioaccumulating chemicals such as PCBs, dioxins/furans, and DDT.

Page 40, Section 3.3.6.1. It is correct that the extent of shellfish consumption in the lower Willamette is not known. However, the lower Willamette is known to have a commercial crayfish operation. In 2003, DHS contacted ODFW, and found that three individuals have permits for collecting crayfish in the Multnomah County portion of the Willamette River. In addition, DHS has access and contact information for the numerous purchasers of the crayfish. A major purchaser of crayfish from the Multnomah County portion of the Willamette River is Pacific Seafood Co. of Oregon. They purchase between 2-3000 lbs. of crayfish per week. These crayfish are sold live or sent to a third party for cooking, and eventually sold to restaurants. Additional purchases of crayfish include Happy Crab, Tony's Smoke House and Bornstein Seafoods (although Bornstein's crayfish are mainly collected from the Lower Columbia River). Exportation of crayfish from Oregon Rivers to other parts of the world occurs on a regular basis. Pacific Northwest crayfish are prized in Europe after a fungal disease decimated European crayfish populations.

DHS also has information on public inquiries regarding non-commercial harvesting and consumption of crayfish in the lower Willamette.

Page 54, Section 3.5.1.5.3, end of first paragraph. The impact of the health advisory on fish consumption is not known. However, a goal of site remediation is to ultimately remove the fish advisory, so rates for potential future fish consumption should be considered in the absence of a fish advisory.

Page 55, second paragraph. It is highly inappropriate to refer to fish ingestion rates as "high", "higher", and "highest." See main comment above.

Page 68, Section 4.7. With uncertainty discussed throughout the report, it is surprising that in this section there is no mention that the approach used to evaluate dermal risk could underestimate risk by a factor of 2.

Page 71, Section 5.2.1. The statement that health protective assumptions multiplied together magnify the overall conservatism in the risk estimate is misleading if it implies that this is unusual or overly conservative. The approach used in this risk assessment is typical of most baseline risk assessments, follows EPA guidance, and results in reasonable maximum calculated risks.

Page 92, top paragraph. The fact that collection of *Corbicula* is illegal is relevant but not particularly important for the pathway in general. There are indications that *Corbicula* are being collected and consumed. More importantly, *Corbicula* are used as surrogates for bivalve consumption. There is a discussion of past human consumption of bivalves, and the role of *Corbicula* in replacing native species, in *Freshwater Mussels of the Pacific Northwest* (Nathan Jay Nedeau, Allan K. Smith, Jen Stone, and Sarina Jepsen. Second edition available from The Xerces Society for Invertebrate Conservation, 2009. http://www.xerces.org/wp-content/uploads/2009/06/pnw_mussel_guide_2nd_edition.pdf). It is reasonable to assume that bivalve consumption is a potential future exposure pathway.

Therefore, the low clam mass (page 123) that may limit current bivalve consumption does not apply to future exposure. Similarly, the statement on page 150 that it is unknown whether shellfish consumption is occurring is possibly appropriate for current exposure, but not potential future exposure.

Page 105, Section 7.1.1. The fish species for the HHRA evaluation were not selected primarily to be health conservative. They were selected to be representative and reasonably conservative.

Page 107, Section 7.1.4. *I need to look more closely at the data for depurated and undepurated clams. It appears that more than a few chemicals have higher concentrations in depurated clams. This may just represent variability*.

Page 108, Section 7.1.6, second paragraph. Include a discussion of why the detection limits for PAHs were elevated.

Page 112. *Should we look at nitrate/nitrite risk? For drinking water, this could be important in localized areas.*

Page 113, second paragraph. The statement that beach risks evaluated using composite samples are within the EPA acceptable range of 10^{-4} to 10^{-6} should not imply that they are acceptable; the risks are above DEQ's acceptable limit of 10^{-6}. However, this does not necessarily imply that additional characterization of beaches is required.

Page 114, Section 7.1.15. Including an evaluation of all detected chemicals in fish will not bias the results high; this is the appropriate approach to quantify potential risk if the added chemicals contribute to risk. However, not including all chemicals will clearly result in a low bias for risk characterization results.

Page 120, Section 7.2.5.3, first paragraph*. I think we need to respond to which rates they consider to be anecdotal*.

Page 123, second paragraph. The mass of clams collected for analysis during the remedial investigation is relevant for current ingestion rates. Potential future ingestion rates, though, could be higher than current rates.

Page 130, Section 7.3.1. Early-life considerations for carcinogenic PAHs were not included despite the availability of parameter values from EPA Region 10 and DEQ. EPA will provide the LWG with the parameter values so the early-life evaluation can proceed.

Page 131, Section 7.3.4. Chromium VI is reduced to chromium III in anaerobic conditions, not aerobic conditions.

Page 134, Section 7.4.2. If background risks are presented, they need to be discussed in terms of calculated on-site risks. For the higher exposure scenarios, background contributes about 0.2 percent to the overall risk.

Page 138, Section 8.1.1.1, second paragraph. Including the phrase of consuming fish "every day of the year" is misleading. Fish ingestion rates are annualized rates. For example, the rate of 17.5 g/day is equivalent to two 8-oz meals per month. Using a daily rate is a method to simplify the risk calculations, and is not meant to imply that fish are consumed every day.

Page 150, first paragraph, last sentence. The statement that "it is not known whether shellfish consumption actually occurs on an ongoing basis within the Study Area" overstates the issue, and is relevant only to current exposure. Commercial crayfish harvest is known to occur on a regular basis.

Page 151, third bullet. Uncertainty to be considered in the FS is not a conclusion of the risk assessment. Relative to most risk assessment scenarios, consumption of fish has low uncertainty when the chemical concentrations in fish tissue are actually measured, as they were in this project.

Table 2-11. EPA regional screening levels include early life exposure. Appropriate parameter values are provided by EPA. It is inconsistent to screen using early life considerations and then not include an evaluation of early life risks in the risk assessment.

There is a typographical error for benzo[a]pyrene. The correct screening level (210 ug/L for industrial exposure) was printed in the line above.

Table 3-13. The whole-body carp PCB concentration at RM 4-8 is 25 mg/kg. This is considerably larger than the concentrations in the other reach and previous sampling rounds. This should be discussed in the report.

Table 3-24. For some of the areas, the EPCs for depurated and un-depurated samples are similar, or the depurated concentration is greater. This should be discussed in the text.

Table 5-2. A cumulative cancer risk is provided, but not a cumulative hazard index. Include in the summary table the HI values. These can be appropriately footnoted if they are above 1, with a more specific value presented based on an evaluation by target organs.

Tables 5-4, 5-5, 5-8, 5-9, 5-12, 5-13, 5-16, 5-17, 5-20, 5-21, 5-24, 5-25, 5-28, 5-29, 5-32, 5-33, 5-178
In risk assessments, it is common to initially calculate hazard indices by summing hazard quotients from all chemicals even if they have different target organs. This is acknowledged as an over-estimate of hazard, but if the resulting hazard index is less than 1, there is a determination of acceptable risk, and no additional analysis is required. A detailed evaluation of hazard based on target organs can be limited to circumstances where hazard indices are greater than 1. If this approach is used, many tables can be eliminated. Eliminating unnecessary tables will improve the presentation of information in the risk assessment.

Table 5-30. For RM-8 SIL it is unusual that the total PCB congener concentration is an order of magnitude higher than the PCB Aroclor concentration. Explain.

Table 5-74*.* HIs should be presented to two significant digits.

Table 5-182. When risks to infants are evaluated in the final risk assessment, the HI for exposure to PCBs will increase by a factor of 20. The HQ corresponding to a ELCR of 1×10^{-4} will be 100 for PCB exposure (by any route).

Table 5-186, Figure 8-2, and Figure 8-4. The range provided for HI values is by specific target organ, which is inappropriate. The resulting hazard range (up to 8 orders of magnitude) greatly

overstates the uncertainty range. Revise the table to show the range of HI values using the one appropriate HI value for each exposure area and scenario.

The risk summary for CTE also shows unacceptable risk. This should be discussed in the Uncertainty Section, and provides bounds for the evaluation of the conservatism used in the RME evaluation.

Table 5-187. The symbol indicating ELCR greater than 1×10^{-4} should be more prominent than the symbol for 1×10^{-6}.

Table 8-1. The symbol indicating ELCR greater than 1×10^{-4} should be more prominent than the symbol for 1×10^{-6}. Consider using half-filled and filled cells to indicate the different risk levels.

For clarity of the more important risks, revise the order to reflect the magnitude of risk, highest risks first. The order from left to right should be fish, shellfish, sediment, beach, and surface water.

Figures E-2, E-3, and 8-1 to 8-4. The HI uncertainty range is greatly overstated. See general comment above.

Map 5-1 and following. Because the beach areas appear small at this scale, consider coloring the labels for emphasis. It also might be useful to use a consistent color gradient in order of receptors/scenarios because presumably the number of receptors/scenarios is related to the chemical concentration and risk.

Map 5-7. This figure is not needed because the area identified is identical to Map 5-8.

Map 5-8. In addition to showing ELCR at 1×10^{-4}, the map should be modified to also show ELCR areas at 1×10^{-3} and 1×10^{-2}.